



FocusLynx FT

Smart Automation for the FeatherTouch Focuser

Introducing a smarter way to automate your FeatherTouch Focuser without sacrificing the fine FeatherTouch feel. Optec and Starlight Instruments have joined forces to intelligently provide full digital control of your telescope focuser while allowing both manual and remote operations from the same controller and motor. Dual focuser control, WiFi and Ethernet network capabilities, industry standard ASCOM support, and SmartPhone apps combine to provide the next generation control system for astronomical telescope focusers.



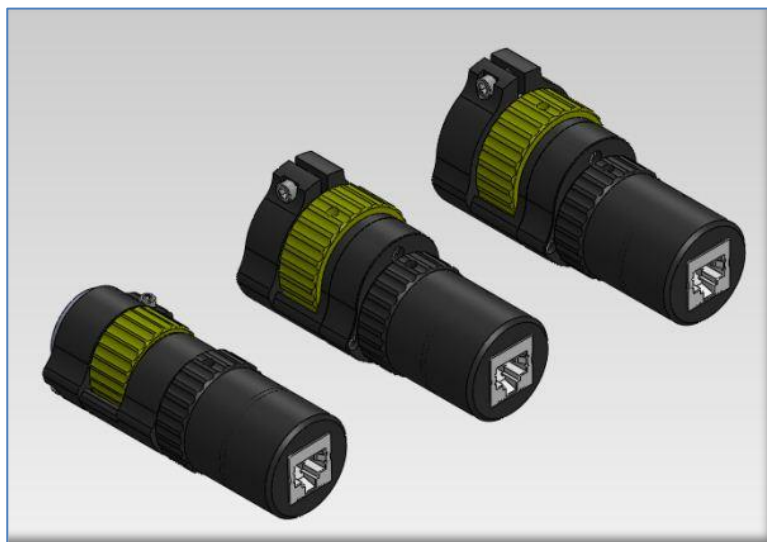
FocusLynx FT Digital Focuser

Smart Automation for the FeatherTouch Focuser

By Jeff Dickerman
President, Optec, Inc.

Optec has been designing and manufacturing high-end instrumentation and devices for astronomers since 1979, including precision photometers, intelligent filter wheels, multi-port instrument selectors, camera field rotators, and temperature compensating focusers. We have watched the hobby of astronomy transition from a visual passion for the stars and wonders of the universe, into a high-tech, fast-paced and highly competitive industry filled with new electronic gadgets, high end software products, and automation of disparate parts, products, and software seldom seen in most hobby industries. Consider that automated telescopes for the amateur were starting to appear as early as 1990.

The skills required to operate a modern automated telescope may seem daunting. It is not unusual to require fluency in electronics, mechanics, networking, software, firmware, and optics, just to assemble a working telescope – regardless of whether the intent is visual use or imaging the heavens. Indeed, it seems today's astronomer designing an observatory full of automated equipment must be as adept in all these disciplines as any systems integrator.



Optec has always been on the forefront of automation though we remain essentially an “after-market” astronomy company. That is, our devices and instruments are almost always used with other excellent products – Celestron and Meade telescopes for example, or SBIG, Apogee, and QSI camera systems.



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FocusLynx FT with QuickSync

Optec seeks out the very best products in our industry and tries to make each just a little better. All the while, we enjoy pushing the limits of technology and automation.

Though generally known for creating devices that operate for years in remote, automated environments with little human interaction, we have recently been enjoying a renaissance of visual observing. We find that many improvements can be made for the visual astronomer, as well as the operator of remote automated observatories. With these thoughts in mind, our engineers looked at an excellent product competing with our venerable TCF-S Temperature Compensating Focuser – the FeatherTouch[®] focuser manufactured by Starlight Instruments.

The FeatherTouch's great claim to fame is that it is arguably the smoothest manual focuser available in astronomy today. The quintessential "FeatherTouch Feel" is derived through an elegant reduction mechanism developed by Werner Schmidt and perfected by Starlight Instruments president Jon Joseph. Werner's design is so good that nearly every manual focuser available today has emulated the design in some way.



Optec TCF-S and FeatherTouch 2-inch focuser

The Optec TCF-S focuser was developed in 1999 by Gerald Persha and remains the most robust and reliable digital focuser available. However, it was never really designed to be a manual device. Indeed, the TCF-S is the "go-to" focuser when you need to put a system in Antarctica with perhaps just one or two visits per year. Optec's focuser is robust, steady, reliable, and repeatable. While we do offer manual IN and OUT buttons with our TCF-S focuser, unattended operation remains our primary goal for the TCF-S and our new TCF-Lynx systems.



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Because automation is our game, we looked at the problem of adding a motor to an essentially manual focuser. How do you add the ability to motorize the FeatherTouch without destroying that “smooth, buttery” feel (as my friend Jon likes to call it)? The *FeatherTouch Feel* is likely the reason most users choose Starlight Instruments in the first place. So the problem remains, how do you create a simple system that allows an astronomer to set up in the field and see the wonders of the universe through an eyepiece, then transform easily to a photographic setup with fully automated focusing? We’ve developed a solution to this problem, and the answer is the **FocusLynx FT with QuickSync**.



FocusLynx FT prototype with QuickSync motor for FeatherTouch

Introducing FocusLynx FT with QuickSync

Optec is proud to announce the marriage of Optec’s digital automation and Starlight Instruments FeatherTouch feel. Combining the FocusLynx Controller Hub with a new motor housing featuring our **QuickSync** engagement system, the FocusLynx FT offers the best of both worlds.

FocusLynx Controller Hub

Optec has been developing and testing the next generation controller for the TCF Temperature Compensating Focuser for over two years. The design goals were demanding and all encompassing. With a nod to the future, we were able to incorporate every design goal requested:



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FocusLynx FT with QuickSync



Design Goals

- Robust mountable case – no plastic
- Dual focuser capability
- Ethernet and WiFi connectivity
- Smartphone compatibility and control
- Simple serial connectivity for the hobbyist
- Pulse-Width Modulation control of stepper motors
- Higher focuser resolutions
- Higher torque for heavier payload capacity
- Temperature compensation

Nuts and Bolts

The FocusLynx system consists of several components that can be purchased individually or as a complete package.

FocusLynx Controller

The basic FocusLynx controller is a small, all aluminum case measuring 5 x 3 x 1-inches. On the bottom are well labeled connections for power, network, hand control, and serial cables. On top are two connectors for the focusers to be controlled. All cables are standard off-the-shelf cables with the exception of Optec's proprietary USB/Serial cable which is included in the package.

FocusLynx Options

Out-of-the-box, the FocusLynx controller will provide digital control for one focuser stepper motor. A second stepper board can be easily added to convert to dual focuser control. Dual focuser kits are available providing everything needed to get started.

Also available in kits or as user-installed options are a **WiFi** add-on board for smartphone and laptop access and an external **Hand Control** for users desiring push button ease and digital read-out.

Software Control and ASCOM

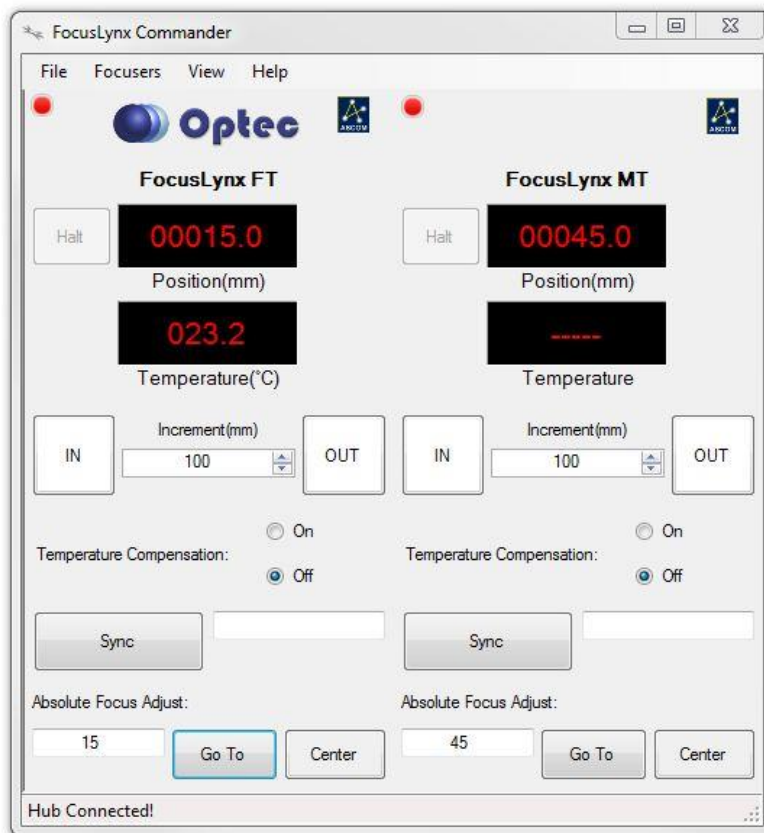
The FocusLynx system was built from the ground up to be fully compatible with ASCOM focuser standards and allows multiple connections from multiple ASCOM clients. That means you can connect up through the FocusLynx Commander (included), Maxim D/L, and FocusMax simultaneously without having to disconnect and reconnect. Automation programs like ACP, CCD AutoPilot, and CCD Commander can access the dual FocusLynx focusers with ease, regardless of the physical connection.



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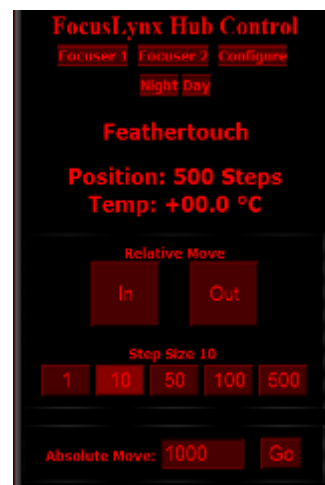
FocusLynx FT with QuickSync



Whether you choose serial, USB, Ethernet, or WiFi connectivity, all ASCOM clients connect up easily, every time. Calibrating and aligning your FeatherTouch focuser is as simple as entering the actual focuser position and clicking the **Sync** button.

Android and iPhone Control

With the optional WiFi module direct control of both focusers is available from your SmartPhone. Free applets are available from the Google Play and the Apple Store.



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FocusLynx FT with QuickSync



FocusLynx FT for FeatherTouch

While the FocusLynx system will control any unipolar stepper motor including the original TCF-S and MicroTouch[®] motors, the PWM control circuitry really achieves peak performance with bi-polar motors. When considering a replacement for the unipolar MicroTouch motor, Optec engineers considered the most important needs for digital focusing today. Among the most significant:

- High Resolution using smaller step sizes
- More Power for heavier camera payloads
- Temperature Compensation for fewer re-focus adjustments

With new information revealing the Critical Focus Zone is smaller than originally thought, higher resolution and smaller step sizes are essential. The FocusLynx FT offers the highest resolution currently available with 1-micron steps. As camera and instrument packages continue to become heavier, the focuser must be able to move these heavier loads without slipping. Lab tests with a FeatherTouch 2.7-inch focuser pushed 35-lbs. vertically without hesitation. FocusLynx FT incorporates a temperature sensor at the telescope, where it belongs, and produces a much more reliable temperature compensation algorithm for accurate automatic temperature adjustments. An easy-to-use Temperature Compensation Wizard makes determining the system TC (temperature coefficient) simple without loss of imaging time.

FocusLynx FT Motor Assembly

What really makes the FT motor assembly unique is **QuickSync** - a smooth clutch mechanism that allows simple manual engagement of the focus motor. Rotate the **QuickSync** motor housing forward to engage the motor and control the focuser electronically, then rotate the motor housing backward to disengage the motor and resume manual fine focus.

QuickSync - Simple, elegant, and beautifully implemented.

The FT QuickSync motor assemblies are available in three sizes packaged with the FocusLynx controller, power supply, and all required cables. The FT QuickSync motor assembly is also available separately as an add-on for a second focuser package.



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FocusLynx FT with QuickSync



FocusLynx FT QuickSync with FeatherTouch Focusers



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FocusLynx FT with QuickSync

FocusLynx FT Package Options

FocusLynx FT is available in three models to match the various FeatherTouch focuser sizes.

- FocusLynx FT20 - fits the classic 2-inch Feathertouch focusers
- FocusLynx FT30 - fits the 2.5-inch, 2.7-inch, and 3-inch Feathertouch focusers
- FocusLynx FT40 - fits the large 3.5-inch and 4-inch Feathertouch focusers

The FT20, FT30, and FT40 packages include the FocusLynx controller, power supply, cables, software, and FT motor housing. A complete solution right out of the box, hardware and software installation takes less than 10 minutes.



FocusLynx Package Contents



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FocusLynx FT with QuickSync

Backward Compatibility for MicroTouch®

What if you already own a MicroTouch motor housing and want to continue using it? For owners of existing MicroTouch motors, Optec offers a special low cost cable option to control the unipolar motor of the original Starlight Instruments MicroTouch. While you won't enjoy the higher resolution, higher torque, and **QuickSync** convenience the FocusLynx FT offers, the FocusLynx controller can drive the MicroTouch unipolar motor quite well with no other loss of performance.

Resolution remains at 6.5 microns per step for FeatherTouch classic Crayford focusers and 0.26 microns per step for SCT Micro focusers.

A simple MicroTouch motor control cable can be made from any Ethernet Cat5 cable. Optec offers complete packages which include the FocusLynx hub and this motor cable, or a full temperature probe kit to allow temperature compensation with the FocusLynx controller and MicroTouch motor.



*FocusLynx Controller Hub configured for MicroTouch motor.
(Shown with FeatherTouch MPA/TRF pinion assembly on Takahashi TOA-130)*



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Starlight Instruments



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